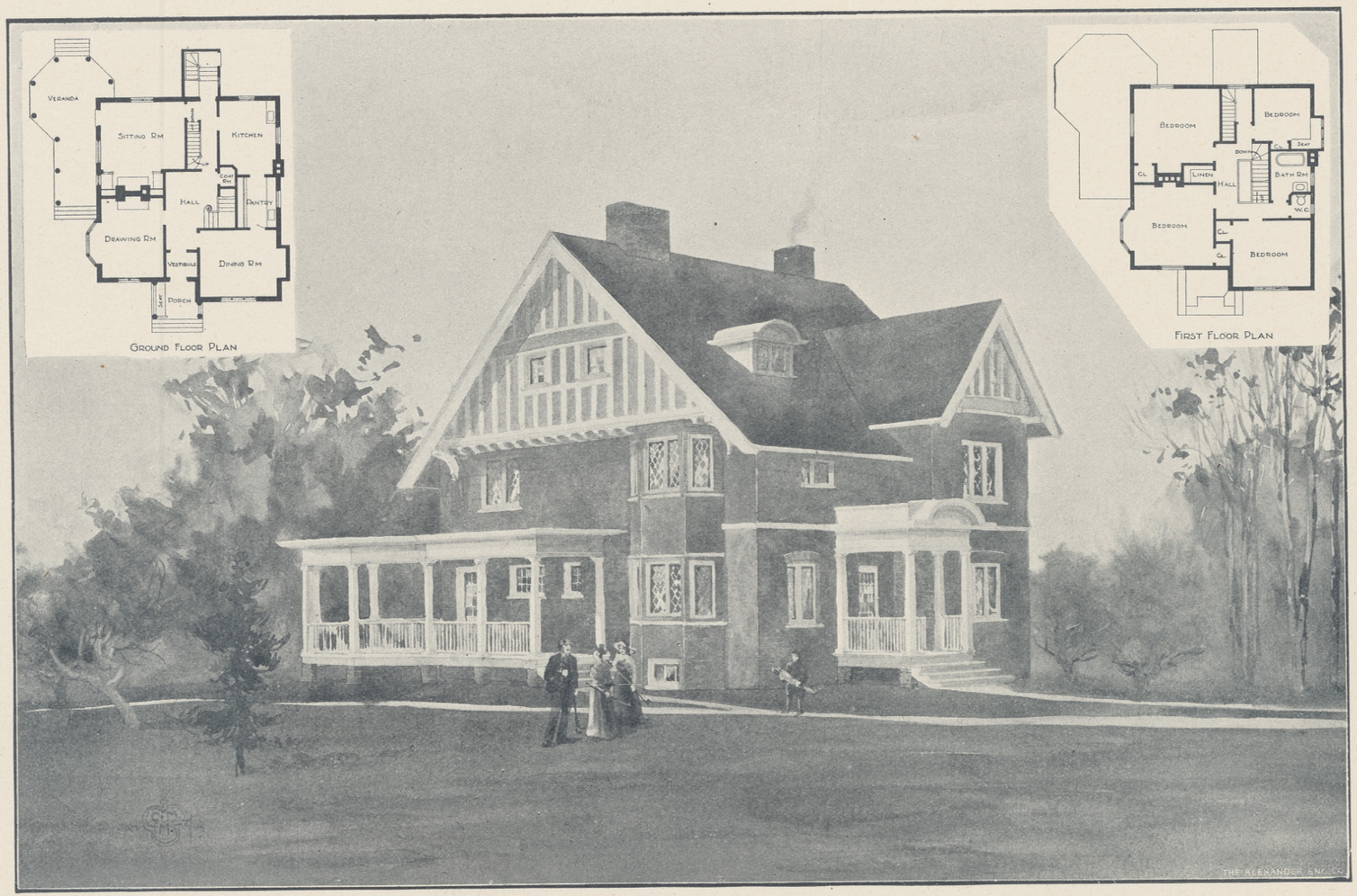
INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

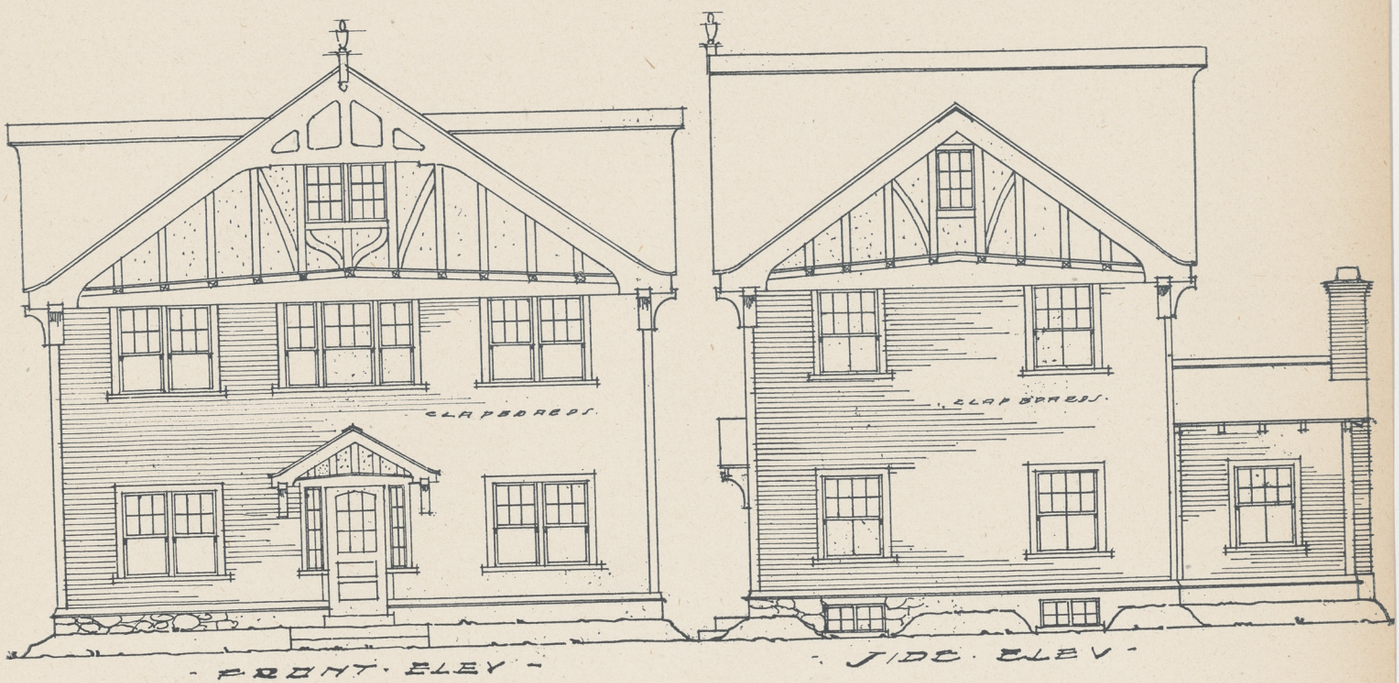
DIRECTORY OF LEADING STONE AND GRANITE DEALERS

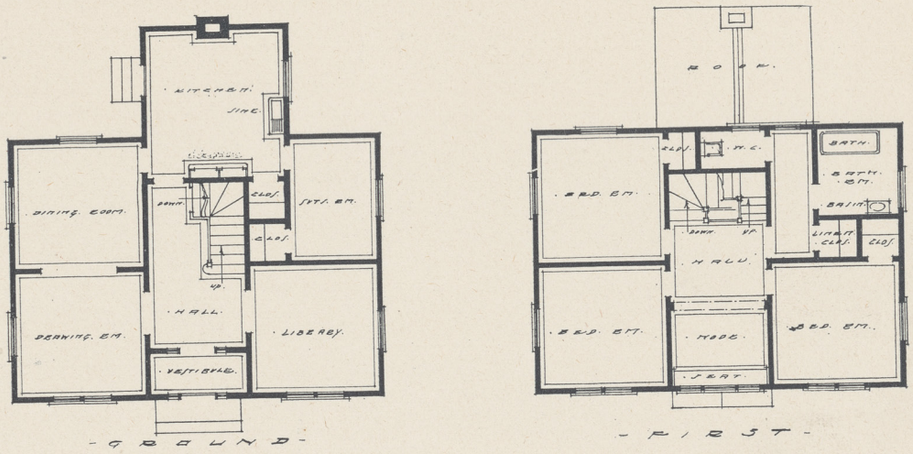


HOUSE, POPLAR PLAINS ROAD, TORONTO.

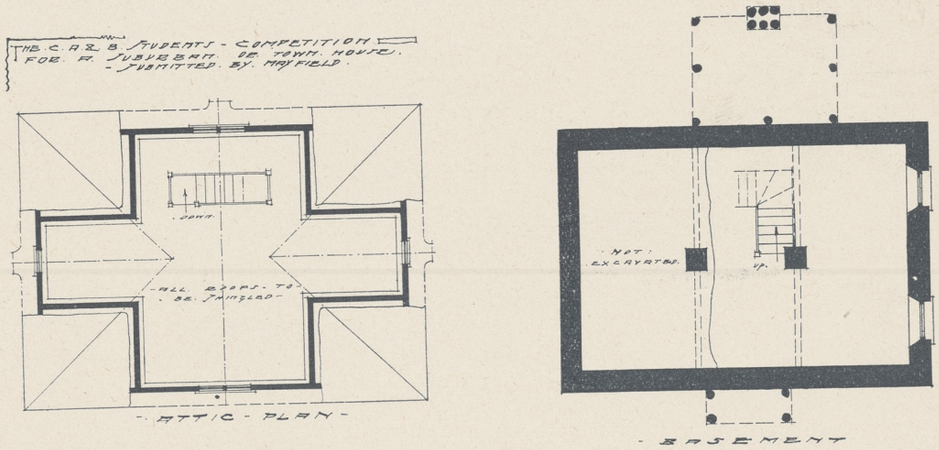
GREGG & GREGG, ARCHITECTS.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
MARCH, 1903





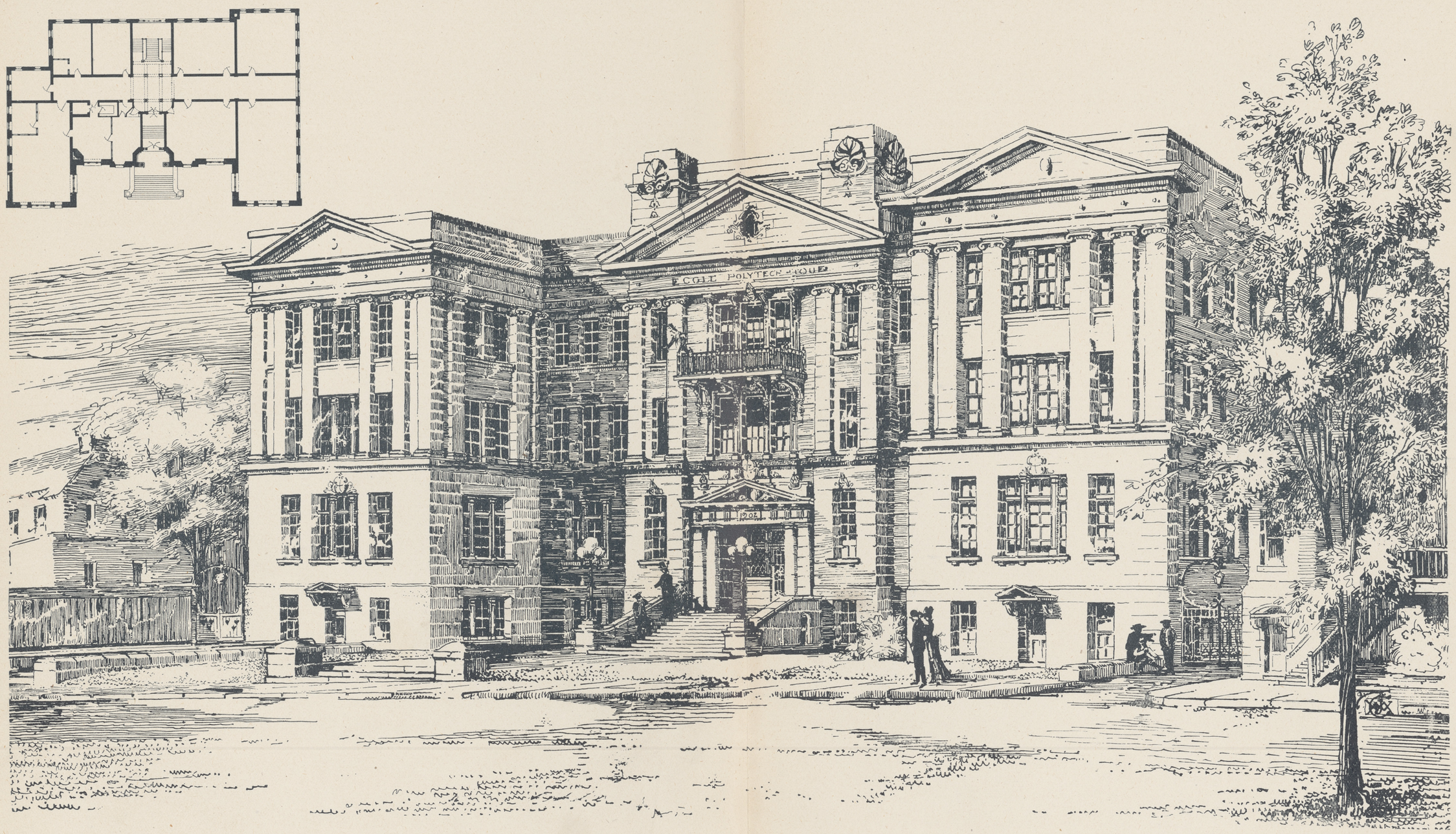
THE C. A. & B. STUDENTS' - COMPETITION FOR A SUBURBAN OR TOWN HOUSE. - SUBMITTED BY MAYFIELD.



C. A. & B. STUDENTS' COMPETITION FOR A $2,500 TOWN OR SUBURBAN HOUSE.

DESIGN PLACED THIRD, BY "MAYFIELD" (GEO. C. EGG).

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
MARCH, 1903



POLYTECHNIC SCHOOL, MONTREAL.

J. E. Vanier, Architect.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
MARCH 1908

The Canadian Architect and Builder

VOL. XVI.—No. 183. MARCH, 1903.

ILLUSTRATIONS ON SHEETS.

C. A. & B. Students' Competition for a Town or Suburban House.—Design awarded Third Prize by "Mayfield," (Geo. C. Egg.)
House, Poplar Plains Road, Toronto.—Gregg & Gregg, Architects.
Polytechnic School, Montreal.

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Design for Church in Devonshire.—A. H. Skipworth, Architect.
Church at Abbeydale, Sharrow, Sheffield, Eng.—A. H. Skipworth, Architect.

ILLUSTRATIONS IN TEXT.

Plan of Grounds showing Buildings under construction for the Louisiana Purchase Exposition, St. Louis, Mo.
People's Bank of New Brunswick, Fredericton, N. B.

CONTENTS

SPECIAL CONTRIBUTORS.

PROF. S. H. CAPPER, R.C.A., Department of Architecture, McGill University, Montreal
MR. W. A. LANGTON, Architect, Toronto.
" EDMUND BURKE, " "
" S. H. TOWNSEND, " "
" FREDERICK G. TODD, Landscape Architect, Montreal
" W. H. ELLIOTT, Toronto.
" J. C. B. HORWOOD, Architect, Toronto.
" A. F. DUNLOP, R.C.A., Architect, Montreal.
" FRED. T. HODGSON, Architect, Collingwood, Ont.

Government Building Designs by Competition.

It is gratifying to learn that the system recently inaugurated in the United States of procuring designs for government buildings by limited competition among architects of the first rank in private practice, has proved entirely successful. So satisfactory have been its results that it is proposed for the future to include in such competitions public buildings of less importance and cost than those to which the Tarnsey Act was originally intended to apply. With such a precedent before them the Federal and Provincial Governments of Canada should adopt the system in this country. The result would be that Canadian architects would be stimulated to put forth their best efforts, and variety and interest would be imparted to government buildings throughout the country, such as many of the existing ones do not possess. Again, the influence of a number of well designed public buildings scattered throughout the length and breadth of the Dominion would react beneficially upon the general architecture of the country. Why do not the Architectural Associations of Ontario and Quebec earnestly take up this matter and persistently press home upon government the advantages of the competitive system.

Municipal Art Commissions.

The Art Commission of the city of New York is a pronounced success and a lesson to other cities. During the past year they gave an opinion (not always favourable) upon fifty-five sets of plans for different structures; and, as the President of the Commission says in his report, the plans disapproved have been amended or perfected so as to "show a marked improvement, concurred in as such by the original designers." The Commission's principal power is only the power of veto; but that is final, and, as designers do not want to run up against it and be turned back to amend their drawings, the consequence is (to quote the President again) that "greater care is being taken in the preparation of designs than ever has been the case." In other words the old idea is upset—that anything will do for the city; that it is not design that counts but pull. All this is the work of ten gentlemen whose services on this commission cost the city nothing. It surely is worth the while of other cities to get an art commission appointed without delay. Sodom and Gomorrah are not the only cities that ten righteous men could save. No doubt the dread of putting so much power in any one's hands has hitherto been deterrent; but the evidence of New York's experience goes to show that this fear is groundless; that human nature tends to rise to what is expected of it; and that an art commission in whom trust is really reposed will be really trustworthy. The New York Art Commission has the confidence of the community. When the commission declined to allow the old Tweed County Court House to be extended to within a few feet of the City Hall, and so ruin the City Hall Park, public comment was "if we had had the Art Commission earlier we should never have had such a monstrosity as the County

Court House at all." The Commission is a power in the city. Simply by execising it's veto, it kept the committee for the Soldiers' and Sailors' Monument marching about for a site, disapproving of one after another, until the present admirable site on Riverside Drive was found. It has kept numberless unsuitable structures from being erected in the Plaza, to the injury of Central Park. The Commission works. When shall we see something of the sort in Canada? Here is the composition of the Art Commission of New York: The Mayor ; three permanent officials, viz.: the Presidents of the Public Library, of the Metropolitan Museum of Art and of the Brooklyn Institute of Arts and Sciences ; three representatives of the three professions of architecture, painting and sculpture ; and three gentlemen specified to be not members of any profession of the fine arts. We have at least half a dozen cities in Canada in which a similar body could be selected without difficulty.

The Basing Unit in Concrete.

Mr. Charles M. Crawford, of the Hartford (Conn.) Paving and Construction Co., in a paper, which was read before the Connecticut Society of Civil Engineers, and published in a recent number of the Engineering Record, demonstrates the importance of more accurate definition than is usually given of the basing unit in cement concrete. Mr. Crawford cites the specification for an important public improvement in the State of New York. This specification reads :— the "concrete . . . will be proportioned: — one part by volume of Portland cement; eight parts of volume of aggregate of stone, gravel and sand." The question is, how is the volume of the unit of Portland cement to be measured—in the barrel or out of the barrel? A barrel of cement is the usual unit of volume; but a barrel of cement has two volumes — one in the barrel and one out of the barrel.

Mr. Crawford quotes test measurements of barrels, in which Portland cement of different brands had been packed, as ranging from 3.24 to 3.59 cubic feet; but the volume of the cement, when loose, is greater. Tests made for himself established the weight of a cubic foot of Atlas Portland cement, loose, at 91.27 lbs., making a barrel (380 lbs) equal 4.16 cubic feet. Here is a difference which has a serious bearing upon the question of cost.

Take the smaller measurement. If the "one part by volume of Portland cement" be taken as 3.25 cubic feet, the aggregate will be eight times as much, or 26 cubic feet. Of this 40 per cent., or 10.4 cubic feet (which is about the proportion of the voids), will be sand and 60 per cent., or 15.6 cubic feet will be stone; and the mixture will make about 16 cubic feet of concrete.

If the larger measurement, 4.16 cubic feet, be taken for the barrel of Portland cement;— there will be 33.28 cubic feet of aggregate, composed of 13.31 cubic feet of sand and 19.97 cubic feet of stone; and the mixture will make about 21 cubic feet of concrete

---

The cost of these two operations—with cement $1.50 a barrel, sand 60 cents a cubic yard, and stone $1.50 a cubic yard—will, in the first instance, be $4.37 a cubic yard, without labour, and, in the second, $3.74; a difference of 63 cents a cubic yard. We have made the calculation from prices said to have been in force when the work for the specification in question was let. As cement has since gone up in price, the difference now would be even greater. But taking 63 cents as a possible difference in the cost per cubic yard:—as the work covered by the specification in question amounted to about 90,000 cubic yards of concrete, the sum involved in a difference of opinion as to the volume of the basing unit would be, as Mr. Crawford says, "worth considering."

P. Q. A. A. Scholarship.

It is rather remarkable that the well endowed and equipped department of architecture at McGill University should still lack students in spite of the fact that examination is the only way to the practice of architecture in that province. The Province of Quebec Association of Architects have considered it incumbent on them in order to make the benefit of the architectural course felt, to create a scholarship both entitling and compelling the winner of it to take the full four years' course at McGill University. This is no doubt a move that will in time effect its object. The first student who wins the scholarship and takes the course will of course be snapped up by a good office, and then it will begin to become apparent to the rest that something has happened which makes the architectural course desirable. If immediate advancement comes to two or three students who have taken the course, it will become a necessity. A distant view of himself either the better or the worse for having or not having a good professional education it is not easy to bring before the mind of a young man, but he can see immediate consequences ; and it ought not take long to fill the architectural lecture rooms of McGill with students, if it is once demonstrated that to have passed the course gives the student an immediate success that can be measured in terms of dollars and cents as well as of opportunity.

A further proposition was made, as an additional suggestion, in the same report of the Educational Committee of the P. Q. A. A. :—that "some (members) might see their way to make arrangements with students in their offices so that for the help given by such students outside of the regular season and hours of a college course, the employer might pay the fees of such course." This in common with the rest of the report was adopted and "the Council instructed to take steps to give effect thereto," but this is a proposition that requires careful handling lest it do more harm than good.

The thing to be borne in mind, in offering inducements to architectural students to do their studying thoroughly, is that the inducements must be inducements to work, to take the profession seriously ; not inducements to enter the profession as the softest thing going ; and it is a question—if education is provided, for the mere consideration of filling out the year in an architect's office (which the student would do anyway if he were obliged, for want of this kind offer, to get his training entirely in an architect's office)—it is a question whether the profession of architecture in the Province of Quebec will not have

the greatest claims to popularity with an undesirable class; that class of young men who, with a sort of general capacity in some degree but with no decided bent, are ready to be attracted by incidental attractions in any of the professions. If electrical engineering continues to require a long apprenticeship under the orders of mechanics, while architecture offers a university education free of charge, the usefulness of electrical engineering as a limbo for the vaguely aspiring sons of vaguely aspiring parents, who would otherwise aim at architecture, will be gone; architecture will excel in popularity but its chances as an art will be proportionately diminished.

The same doubt hangs over the proposition to create a travelling scholarship. As stated in the Educational Committee's report the proposition is that only "regular students" who have graduated and taken their degree in architecture at the university "shall be eligible for the scholarship." That is an excellent proposition; but the motion to adopt gives the Council "power to modify the details with regard to clause 4," which is the clause relating to this scholarship.

It is to be hoped the Council will not attach this scholarship to anything less than a full career in arts and architecture at McGill. Then we shall feel sure not only that it is in the right hands but that the process of getting it is too long—requires too much decision of mind towards this career and too much hard work—to attract triflers. It is attraction that is principally to be feared. The actual winner of a scholarship may be of the right stuff but, unless the scholarship is so hedged by conditions of preliminary service that it colours the prospect with visions of work rather than with visions of foreign travel—for every trained and travelled student the profession gains, we shall have another or possibly more whom the chance of free foreign travel has enticed to desert a career of usefulness to others and profit to himself in "business."

THE EFFECT OF HIGH PRICES ON BUILDING.

Attention is being called to the manner in which the demands of workmen in the building trades coupled with the high prices of materials, is checking building enterprise in Toronto.

Notwithstanding the all-round advance in wages last year, several of the unions have already decided to demand a further substantial increase. The plasterers for example, are asking 45 cents per hour, an advance of 7 cents. It is understood to be the intention of the plumbers to demand 65 cents per hour; the painters have also demanded an advance while at the same time they have voted down the request of the employers to be allowed three instead of two apprentices to each shop, and that the term of apprenticeship be extended.

In view of these demands and the uncertainty as to what the scale of wages will be, contractors feel obliged to protect themselves against loss by a substantial increase in their tenders. This has already resulted in blocking considerable work which, had prices remained about the same as last year, would have gone forward to completion.

The opinion prevails that the point has been reached at which any addition to the cost of either materials or labor will prove to be the last straw which will break the back of many building enterprises. This is a particularly unfortunate condition when money is plentiful, and under favorable circumstances would be largely invested in new buildings.

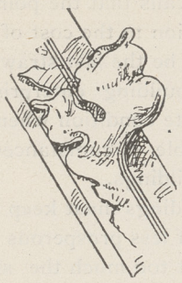
Investors in buildings must keep in mind the possibility of a return of less prosperous times, when if their buildings have cost too much the shrinkage in values may entail upon them a loss. Thousands of owners found themselves in this position on the collapse of the real estate boom in Toronto several years ago.

Some large commercial undertakings may go on in spite of higher prices, but many smaller ones, especially residences, will be stopped. This means a few large contracts for a few large contractors and employment for a few hundred workmen, leaving idle a much larger number of both masters and mechanics.

Workmen give as a reason why they should have more pay that the cost of living, including rents, has greatly advanced. They apparently do not see that this advance is largely due to their constant and ever increasing demands for more wages and shorter hours, and that as they comprise the bulk of the consuming class, they are themselves called on to bear the heaviest part of the burden. This was clearly demonstrated by the recent coal strike, the effects of which were felt most severely by mechanics and laborers. This strike has probably permanently increased the price of coal in this country. In the case of articles of general consumption such as fuel, the use of which cannot be dispensed with, the future policy of the producing companies will probably be to cease fighting against higher prices in behalf of the consumers from whom they get no thanks, and to accede to all demands of their workmen and charge up the extra cost to the consumer. Who is the consumer? In seven cases out of ten he is the wage earner, the man who is least able to bear the added burden.

In the case of the building industry, the conditions are somewhat different, but the result is much the same. People are not obliged to build expensive residences—they can live in the old ones, take rooms in an apartment house or an hotel, or adopt other modes of living which are at least less expensive and freer from care than the management of a modern house. So it happens that when prices of materials and labor reach a certain point, building enterprise slackens, the demand for materials falls off and the mechanic in the building trades and in the factory is thrown out of employment. All of which goes to show that it is possible to kill the goose that lays the golden egg, and also that to do so is a very short-sighted and unwise proceeding.

In joining parts of metal and glass by means of plaster of Paris, a serious source of trouble (according to "Werkstatt") is the tendency of the plaster to set and harden before a proper cementation has been attained. This can be easily prevented by adding to the water with which the plaster is mixed 6 per cent. of alcohol. Then sufficient time will be allowed for cementing before complete hardening occurs. Too much alcohol must not be used, otherwise the plaster will not harden.



COLOGNE CATHEDRAL.

BY THE WAY.

In the opinion of the Irish Builder Chubb's new patent front-door latch, with very small key, is an extremely handy, up-to-date idea. The Club man who may have occasion to use the very small key has yet to be heard from.

× × ×

Towns like individuals frequently refuse or neglect to profit by experience. A case in point is the town of Liverpool, Nova Scotia, which, although fire swept only seven years ago, has again been almost wiped out of existence by fire.

× × ×

A prominent bank president of Hartford was having his house repainted recently. To him entered a caller, who said:—"Do you know that your house is being painted by non-union men?" "Yes," was the answer, "I took particular pains to find them. Get out!" That is all the story, except that the house is painted.

× × ×

Colonel Butler, a former Sessions Judge in Burma, and retired, happened to be an artist and has painted some very pretty scenery as well as birds and flowers in the Japanese style on the walls of the Maubin Court House in Lower Burma. It forms says Indian Engineering, a pleasing contrast to the generality of such buildings, though we fear the minds of accused persons committed to the Sessions are too much occupied with other thoughts to appreciate pictures, however artistically they may be depicted.

× × ×

A British contemporary tells a good story of an old lady passing by the scene of the demolition of the famous old Newgate Prison in London the other day, when she espied the contractor's enormous steam crane. Appealing to a wily crossing sweeper, said she, "Can you tell me my good man what is that for?" "That 'laidy,' says the wily one, "that is the famous gallows you must have often heard of. Aye, 'laidy,' many's the sickening sight I've often witnessed on that 'ere 'gallis'—take away yer appetite for breakfast—'twould," and as he wiped his eye and pocketed the two-pence, reflected that it was well earned.

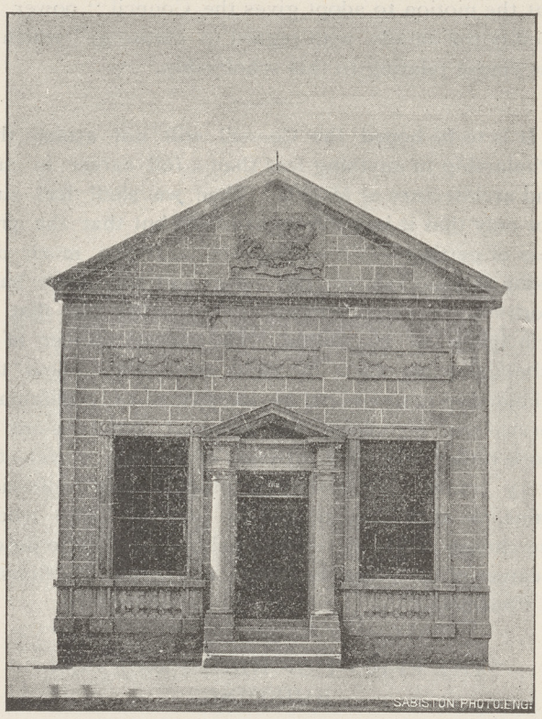
× × ×

A curious action at law is said to be pending in connection with what is known as "The flat Iron Building" on Broadway, New York. The owner of a store opposite this building is said to have brought legal action to compel the owners to reimburse him for the breaking of his plate glass windows by currents of wind alleged to have been deflected from the slanting walls of the "flat iron." The plaintiff alleges that pedestrians have been thrown to the sidewalk by the wind while passing this building, and that in consequence they now avoid the locality. He proposes to secure the testimony of such persons as well as of architects and other experts in support of his claim.

THE EDUCATION OF APPRENTICES.

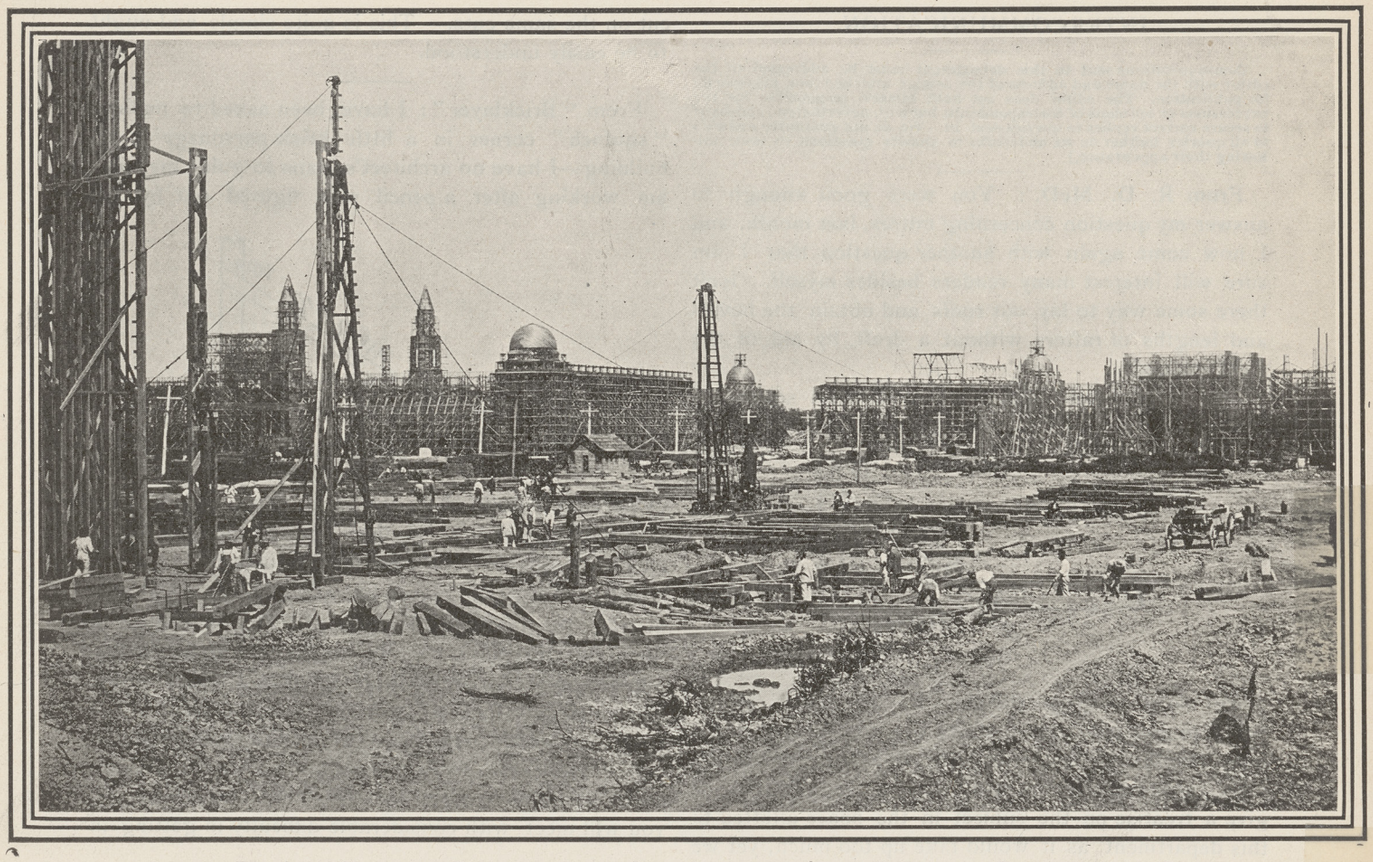
A series of lectures to masons' apprentices were given last winter by members of the Illinois chapter of architects, and were so successful that it has been decided to continue them during the present winter. The master masons and the masons' union have arranged an apprentice system under which each apprentice receives three months' schooling each year, during which time he is obliged to attend school and also receives his pay from his employer.

The Inland Architect states that the city of Chicago has also arranged school-rooms and teachers for their special use, and their studies not only comprise elementary branches, but follow such technical lines as will best serve them in their work. It is encouraging to note that of the apprentices who attended school last winter not one seemed indifferent, and many attended the night as well as the day classes, and all were enthusiastic and diligent. This has all been accomplished by the unselfish work of a few men who wish to aid in the elevation of the workman and the improvement of his work, and shows what can be accomplished in every trade, and how gladly such aid is accepted by the young mechanic who wishes to succeed in mastering his trade.

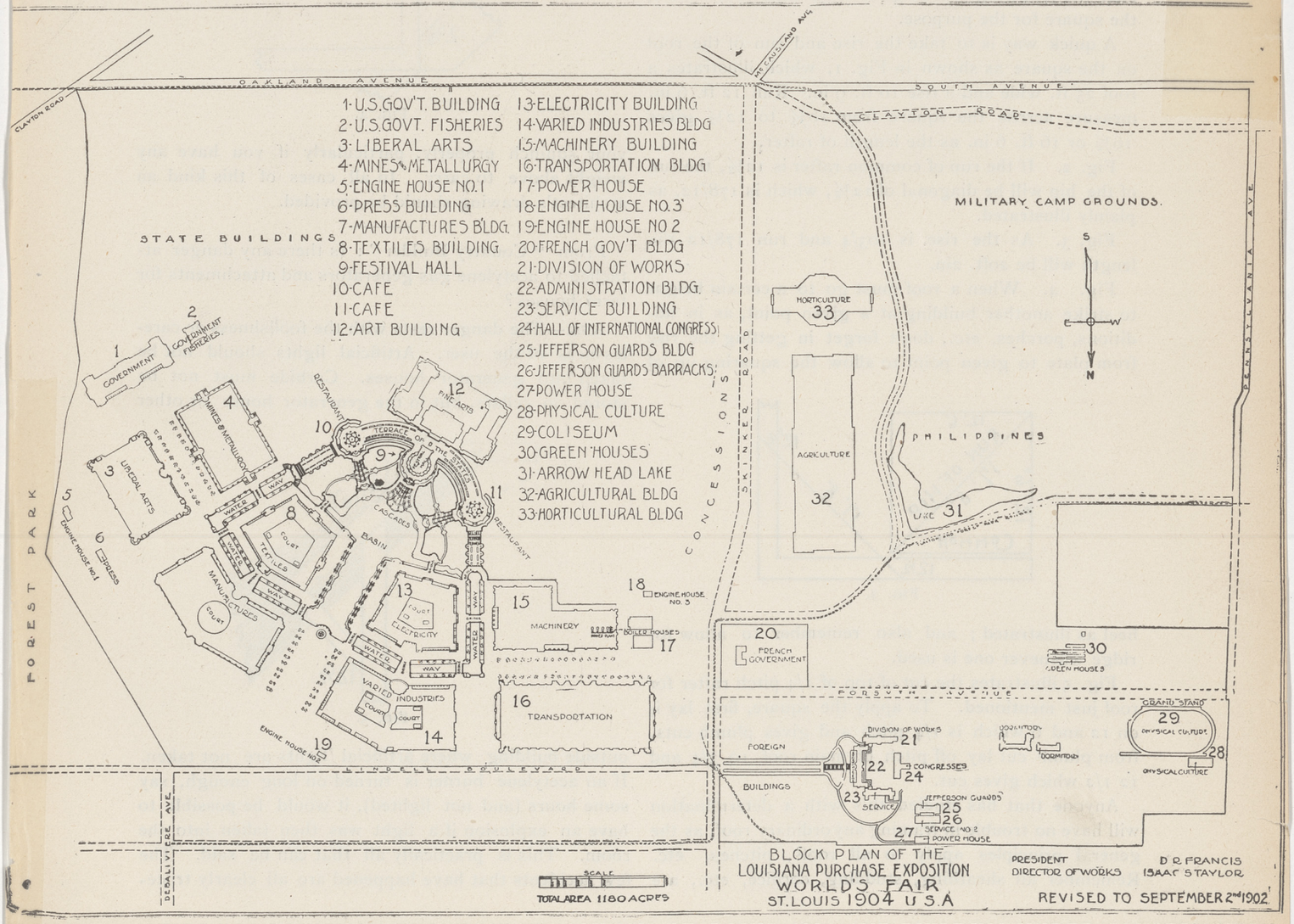


PEOPLE'S BANK OF NEW BRUNSWICK, FREDERICTON, N. B.

The Engineering Record states that the lettering of titles and important legends on drawings is expedited in the drafting rooms of the Bureau of Filtration, Philadelphia, by the use of standard letter sheets about 11x14 inches in size upon which are printed five standard alphabets and sets of numerals in plain Gothic type. These sheets also contain words most frequently occuring in titles and other places printed in the size of letter most frequently used for them. In this way a great deal of time usually spent in spacing is saved, for the draughtsman can slip one of the standard letter sheets under his tracing and copy the words needed.



LOOKING EAST FROM MACHINERY BUILDING—VARIED INDUSTRIES ON THE LEFT, ELECTRICITY BUILDING ON THE RIGHT.



PLAN OF GROUNDS FOR LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO., AND BUILDING UNDER CONSTRUCTION.

INTERCOMMUNICATION.

Communications sent to this department must be addressed to the editor with the name and address of the sender attached not necessarily for publication. The editor does not hold himself responsible for the expressions or opinions of correspondents, but will, nevertheless, endeavor to secure correct replies to queries sent in. We do not guarantee answers to all queries neither do we undertake to answer questions in issue following their appearance.]

From R. D. McD.: You were good enough to answer my question concerning mitres, last month, and I now come again with another question that I am sure will interest many readers besides myself. Isn't there some way to lay out roofs and obtain the bevels and lengths of rafters without a draft, by aid of the steel square?

ANS:—An expert in the use of the steel square re-

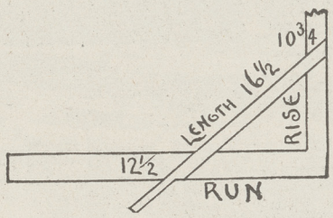


FIG. 1.

quires no drawing or template for laying out rafters. By a proper application of the square, he can obtain exact lengths and bevels for all kinds of common rafters, hips, valleys and jack rafters. While it is impossible to give a treatise on the subject in the space allotted to this department, as it would take up too much, yet we offer the following. which gives a fair idea of the use of the square for the purpose.

A quick way is to take the rise and run of the roof on the square as shown in Fig. 1, which illustrates a roof 25 ft. wide and a rise 10 ft. 9 in. Run 12 ft. 6 in. measure across the square from 10¾ to 12½ gives 16½ or 16 ft. 6 in. as the length of rafter.

Fig. 2. If the run of common rafter is 12½, the run of the hip will be diagonal of 12½, which is 178/12, as plainly illustrated.

Fig. 3. As the rise is 103/4 and run 178/12 the length will be 20ft. 2in.

Fig. 4. When a roof must go to a certain height to strike another building at a given point, as in additions, porches, etc., don't forget in getting the rise from plate to given point to allow the squaring up of

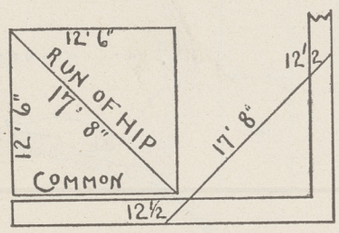


FIG. 2.

heel as illustrated; and also remember to allow for ridge whenever one is used.

Fig. 5 illustrates the cut of top of 1/4 pitch rafter for roof just mentioned. To apply the square, first lay it on 12 and 6 which is 1/4 pitch and gives plumb cuts, from plumb cut lay off pitch of main roof 10 3/4 and 12 1/2 which gives cut.

Anyone that has studied this with a determination will have no trouble in framing any ordinary roof, as the general principles apply to all roofs, pitches, etc. Remember all sheathing, studding, cornice, etc., are cut on the same cuts. This is quite simple and ought to be easily understood.

From "Bricklayer": I have been asked to make a "squinch" corner in a little brick parsonage I am building—I have no architect's plans to guide me, as I am working after a pencil plan figured out by the

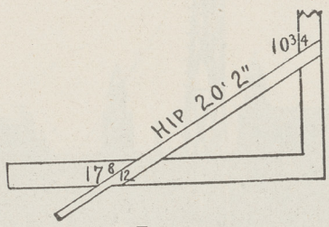


FIG. 3.

owner and myself. I do not know that I have a clear conception of what a "squinch corner" is, and will be pleased to get some pointers on the subject?

ANS.—"Squinch" is an old name for a corner cupboard. In Gothic architecture the term is applied to the arches thrown across the angles of a square building to bring it to an octagon, as when a square tower has to be prepared to carry an octagon spire. The spaces under the arches have a fanciful resemblance to corner cupboards, whence probably the term. We are afraid if you have never done this kind of work before, you will meet with considerable difficulty in getting in

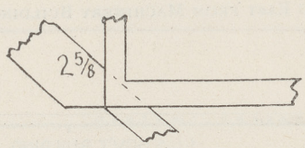


FIG. 4.

your squinch properly, particularly if you have any weight above to carry. In all cases of this kind an architect's drawing should be provided.

From "Country Builder": Is there any danger attached to acetylene gas generators and attachments for farm houses?

ANS.—The danger rests with the foolishness or carelessness of the user. Artificial lights should not be taken into generator houses. Carbide must not be stored in cellars, but in the generator house or other

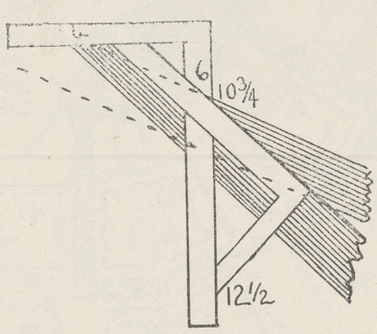
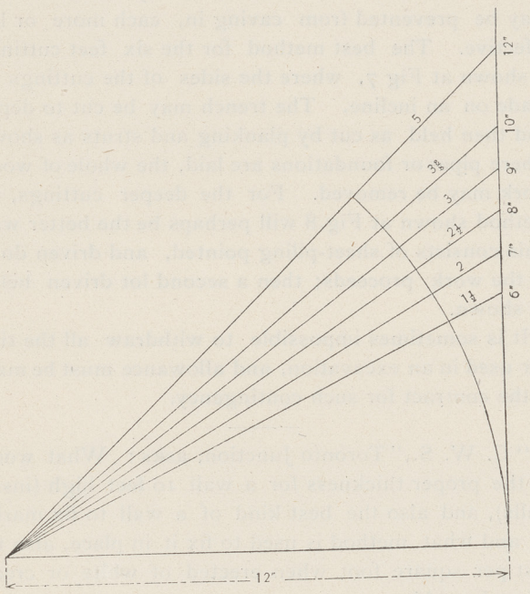


FIG. 5.

outside building where artificial lights are not taken. If an acetylene burner is turned on long enough, say some hours (and not lighted), it would be possible to have an explosion if a light was then taken into the room. This is practically all that can be said. The few accidents that have happened are all clearly trace-

able to the most culpable carelessness. Acetylene, in a general sense, is safer than oil lamps. There is less risk of poisoning by breathing it than there is with coal gas. Generators must be placed where the frost can not reach them, for should the water in the tank freeze,



Calculating Number of Squares in a Roof.—Diagram.—Scale, Inches to a Foot.
FIG. 6.

it will stop the making of gas and interfere with the mechanism of the whole machine.

From "Sheet Metal Worker": Is there any speedy method, that is also simple, by which the number of "squares" in a roof may be obtained.

ANS.—We submit the following for the consideration of our correspondent, and others, which is con-

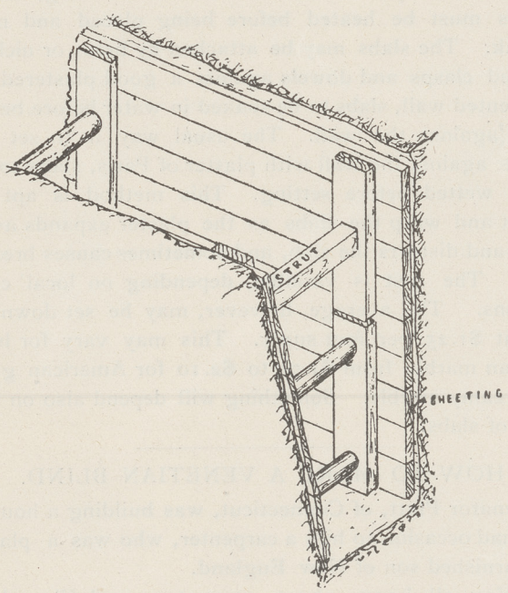


FIG. 7.

densed from an article on this subject, published in "The Metal Worker" some time ago, and which seems to fit the requirements asked for: "As a general thing, in residences having steep or Queen Anne roofs, the pitch is uniform, except on towers and varies from 6 inches in 12 inches for quarter pitch, to 12 inches for half pitch. A favorite pitch in this section is 10 inches in 12 inches. Instead of measuring each section of roof plan separately and adding them up, an easier method is to measure the roof plan flat, as if it were to be covered like a floor. Say that this amounts to 3000 square feet. Have at hand a diagram, like the accompanying sketch, Fig. 6, which shows different pitched roofs, from 6 in 12 to 12 in 12. Divide the 3000 by 12, the length of the flat line, and multiply the quotient by 5, add the result to the 3000. The calculation will be as follows:

```
12) 3,000 ( 250
    24      5
    --    ---
    60    1,250
    60    3,000
    --    -----
     0    4,250 square feet in roof.
```

The correctness of this method can be proved by assuming a plain roof, 40 x 75 feet in the plan, which is 3000 square feet flat. With a roof 12 x 12 inches pitch, with ridge through the middle, the rafter is 56.7 feet over from eave to eave, as near as can be measured

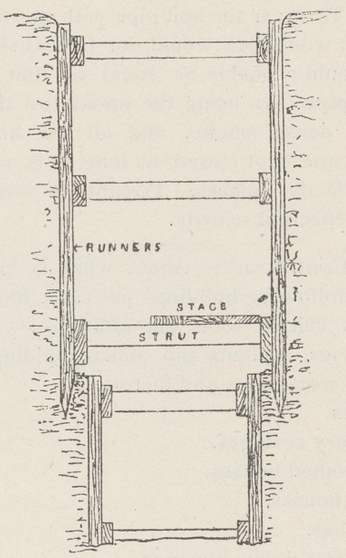


FIG. 8.

with a rule, which, multiplied by 75, gives 4,252.5 square feet. This method is correct, so long as the pitch is uniform. It is also quite simple. The multiplier 5 is what is left after the 12 inches is taken from the pitch line. If the pitch were 9 inches in 12 inches, the multiplier would be 3, as shown. Now, while the multiplier 3 is absolutely correct, 5 is a fraction too large, which can be demonstrated by the well known principle in geometry viz., the square of the base added to the square of the perpendicular equals the square of the hypothenuse. But that is as near as can be measured on an ordinary rule, and it does not affect the correctness of the method. If perfect exactness is required, all we have to do is to extract the square root of the multiplier, and the thing is done but, the average workman knows very little about square-root, and cares less."

From "City Builder" :—I have a water-closet with an S trap which is fixed on the first floor and connected to a 5-inch glazed earthenware soilpipe fixed outside the house. A 1-inch air pipe in the outgo of the trap, but notwithstanding at times there is an

odor of sewage gas in the place. Can it be that the gas finds its way into the room from the outside through the closet window? What remedy would you suggest? I have thought of covering the soil pipe with mortar, and casing the whole in with wood, would that be of any use?

ANS. :—The better plan will be to apply a smoke test to the drain and note whether the smoke escapes from any defective places in the outside soil-pipe, or from the joint inside the house connecting the soil-pipe to the trap or from the joint of the air-pipe. If any defective joints are found they should be made good with Portland cement. The water closet trap is presumed to be earthenware. But if the pipes are cracked, or otherwise defective, they should be replaced with new pipes. The 1 in. air pipe is much too small and is entirely useless for either ventilating the soil pipe or preventing a syphonic action on the water in the trap when a pailful of slops is thrown down the water-closet. A ventilation pipe not less than 4 in. in diameter should be fixed from the top of the soil pipe, and the top end should be as far as possible above the closet or any other window and above the eaves of the roof. To cover the soil pipe with mortar and encase it with woodwork would not be satisfactory and the cost would probably be equal to that of an entirely new pipe. In using the smoke test the drain is filled with dense smoke, and all the known vents stopped up and kept closed, as long as is necessary to discover defective places. Possibly a larger air-pipe may be an effectual remedy.

From "Contractor":—About what is the average cost of the following buildings per cubic foot, including foundations, cellars, roofs and additions?

1. Factories, asylums and similar buildings.
2. Large workshops and factories.
3. Stables.
4. Ordinary cottages.
5. Six-roomed houses.
6. Town houses.
7. Churches.
8. Halls and public libraries.
9. Large hotels.
10. Town halls and similar buildings.

ANS.—There are questions to which answers can be only approximately given, as much depends on the kind of materials employed, and the locality on which the work is done. The prices we submit while not accurate, are as nearly so as can be obtained, and are intended for buildings of brick.

1.	from	10	to	16	cents	per	cubic foot.
2.	"	7	"	11	"	"	"
3.	"	10	"	16	"	"	"
4.	"	9	"	12	"	"	"
5.	"	15	"	20	"	"	"
6.	"	18	"	30	"	"	"
7.	"	12	"	35	"	"	"
8.	"	12	"	24	"	"	"
9.	"	36	"	48	"	"	"
10.	"	20	"	34	"	"	"

The estimator must exercise judgment in using these figures and consider the quality of materials, styles of finish, and richness of trimmings.

From "Contractor": I have quite a lot of excavating to do this coming summer in ground that is formed largely of live sand; both for laying down drain tiles and for stone foundations and concrete work. In some places I will have to go down twelve feet, but most of the excavating will not be more than six feet deep. What are the best methods of preventing the sides from caving in on the workmen?

ANS.—There are several methods by which the sand may be prevented from caving in, each more or less effective. The best method for the six feet cuttings, is shown at Fig 7, where the sides of the cuttings are made on an incline. The trench may be cut to depth, and then held as cut by planking and struts as shown, where pipes or foundations are laid, the whole of woodwork may be removed. For the deeper cuttings, the method shown at Fig. 8 will perhaps be the better way. This consists of sheet-piling pointed, and driven down as the work proceeds; then a second lot driven below as shown.

It is sometimes impossible to withdraw all the timber used in an excavation, and allowance must be made in the contract for such contingency.

"C. W. S.," Toronto Junction, asks: What would be the proper thickness for a wall 10 feet high (inside walls), and also the best kind of a wall to fix marble to, and what method is used to fix it in place, also the cost per square foot when erected of white or cream colored marble.

ANS.—Marble veneering may be of almost any thickness, but the thinner it is the more expense in preparing backing for it. The best thickness is from ¾ inch to 1 inch. This has proved the most satisfactory. Of course, something depends upon what it is used for. Marble slabs can be fixed to wood, brick or stone. Brick makes the best backing if it is not too new. Brickwork should stand a month or two after being put up before the marble is attached. There are several ways of fastening marble slabs or veneer to a wall. The best is by the use of hot mastic. This, however, is apt to cause trouble in the setting, as the slabs must be heated before being placed and may break. The slabs may be attached by brass or nickel-plated clasps and dowels against a good plastered or cemented wall, slabs to be soaked in water before being laid against the wall. The usual way is to set the slabs against the wall with plaster of Paris, slabs to be well wetted before setting. This method is apt to twist and warp the slabs as the plaster expands as it sets and distorts the slab, and sometimes causes breakage. The cost is variable, depending on local conditions. The average, however, may be set down at about $1.25 per foot super. This may vary for best Italian marble from $1.75 to $2.10 for American grey or creamy marble. Something will depend also on the size of slabs.

HOW TO MAKE A VENETIAN BLIND.

Senator Platt, of Connecticut, was building a house. He had occasion to hire a carpenter, who was a plain, unvarnished son of New England.

"You all know about carpenter work?" asked Senator Platt.

"Yes, sir," was the reply.

"You can make windows, doors and blinds?"

"Oh, yes, sir."

"How would you make a Venetian blind?

The man thought steadily for several minutes. "I think," he remarked finally, "that I would punch him in the eye."

CHIMNEY DESIGN AND CONSTRUCTION.

A British contemporary remarks that it is unusual to think that a chimney has in itself ability to create a draught, but this is not true. Force is always needed. Usually it is heat; in some cases a fan or other machine gives the motion, or external air movements induce the currents. The chimney is merely a tube—the place in which the results of energy are manifested, and without some external power there can be no draught. When there is a current up or down an unused flue, it will be found that the air of the house is warmer or cooler than that outdoors, or the sun's rays may be warming the chimney especially. The amount of current in the flue depends on the difference of density between the air within the flue and that outdoors. Just as the balance falls when one side is heavier than the other, so the lighter column of air rises from the pressure of denser and colder air. It is pushed up by the heavier volume.

The architect's work is to make easy the operation of currents. There must be a convenient entrance for the rarefied air from the fireplace to the flue, and this throat, as it is called, would best slope at an angle of 45 degs. The flue must be built in proportion to the size of the fireplace, and must have as much volume as possible in proportion to its wall area. The surface of a wall exerts an enormous amount of resistance, and especially when there are turns, bends, or changes in size.

Flue linings are desirable, not alone for their protection against fire, but because of their smooth surface and their uniform size. In fact, a rough brick flue, 8 in. x 8 in., when lined becomes 6 in. x 6 in., and although the cross section is not much more than half, the draught is almost equally as good. The shape of the flue must be such as to give a large area, with little friction. Thus a circular flue is better than a square one, and a square better than an oblong rectangle. A triangle is bad, for, with but half the area of a square, it has 85 per cent. of the wall surface. The corner spaces, moreover, soon fill with soot, so as to reduce the original area rapidly.

The flues of old-fashioned city houses, wide and shallow, are especially bad. Thus, 4 in. by 16 in. is no larger than 8 in. by 8 in., yet it has 25 per cent. more wall surface, and 50 per cent. more exposure to the outside cold.

It is always best to have the chimneys in interior walls, as then more heat is radiated to rooms adjoining the flues and less is taken from the smoke. With an outside exposure, the cooling of the smoke seriously reduces draught of the flue. With an interior flue, of course, the more exposed the brickwork the more heat will be received in the house from the chimney, which is not a good feature for a kitchen flue in summer. The size of the flue in cross section should be one-twelfth, or possibly as small as one-fifteenth, the area of the fireplace opening. Soft coal requires a proportion of one to ten.

The chimney must be as high as the highest point of the house, and if there are any high objects near, there will still be trouble when winds are blowing across the chimney toward those objects. In mountainous places a fireplace will inevitably smoke in certain winds, though, of course, an increase in the height of the chimney will help. Except that they increase the height of the opening, chimney tops or cowls do little good. It is not so much the direction of the wind that is disastrous to the draught, but an increase in density of the atmosphere at the place of obstruction. This heavy atmosphere, seeking an outlet to relieve the pressure, goes down the flue and causes a "down-draught."

There is one other feature required for the free burning of a grate-fire, and that is a source of air to supply or replace the draught. It is evident that the air passing up the chimney must be replaced. One cannot suck air out of a bottle. If the furnace is running it supplies a volume of air and materially helps the draught. In the usual case, the air comes through cracks around the doors and windows, and if there be no cracks the draught is checked. The well-built house is more apt to have smoky fireplaces than the cheap contract house. To supply the draught either use some of the grates that are constructed on this principle, or arrange a similar system. Here, too, the wind has an effect on the fire. The side of the house on which the wind blows is under more than normal pressure, and there is a natural exit up the flues of the rooms on one side. On the other hand, the lee-side is subject to suction, and the fireplaces here have this to overcome, or smoke pulls down the flue and into the room.

MATERIALS USED AND NATURAL LAWS WHICH GOVERN THE BUILDING OF GREAT EXPOSITION STRUCTURES.

The materials and methods with which the architectural and the construction problems are solved are here briefly stated.

The masses and details of the designs are represented and rendered in plaster and staff applied to wood sheathing, furring, studding, etc., the latter backed and braced according to needs, by heavier timber and steel framing. All the pedestals, bases, columns, plasters, antae, archivolts, architraves, friezes, cornices, panels, vaulted, groined and domed ceilings, pendentives, medallions, consoles, brackets, niches, parapets, archials, balustrades, spandrels, arches, coffers, caissons, gargoyles, diaphragms, obelisks, globes pavilions, pylons, turrets, trophies, fountains and what not, which the architects have used in their compositions, require a bewildering mass of light framework approaching the general contours of the architectural forms.

When the architectural figures are finished in plaster and staff, they merely "represent" masses, while they are only a light shell mounted on wood forms. These shells rise to such respectable heights that special care is required to brace them against buckling, crushing or overturning by wind. The roofs of these buildings

must generally be carried on long-span trusses, so as to restrict the number of posts and give as much freedom as possible in the arrangement of exhibits. There are no solid walls on which these trusses may be set; they must be supported by pillars from the ground up. The exterior walls are generally secured to these posts and these posts, with knee braces and trusses over them in one direction and portal bracings in the other direction, give to the structure its stability.

All foundations are built of timber, either cribbage or ground sills resting upon the natural solid ground, where the natural ground is not more than four or five feet below the established street grades of the exposition grounds, or upon piles, driven not less than 15 feet into the natural ground, where natural ground is too far below grade to make cribbage practicable or economical, or where the nature of the soil is not above suspicion, as in the basin of the lormer park lake, and the filled-in beds of the River des Peres and its numerous tributaries.

The entire framework for the buildings is of wood, of small size sticks in close proximity shaped to the contours of the architectural exterior, and of massive heavy timbers for truss posts, trusses, knee, spandrel and sway-braces, etc.

THE BUILDERS' EXCHANGE.*

This is an era of development of organized effort in commercial and industrial life. Religious and political societies were coincident with man's earliest activities. Fraternal and social bodies among all classes have existed for generations. In art and literature, science and travel, music and philosophy, during all ages, men have come together in organized effort, for mutual help in their respective vocations. During all time, among all peoples, men have been drawn together in response to a feeling of common interest in a given cause.

Of all the pursuits of men which contribute to the world's progress and improvement, the vocation of the builder would seem to be pre-eminent. Our trade is made honorable and distinctive by divine example. "Builder" is significant of creation and development; of growth and advancement, hence in choosing our occupation, with its subsequent responsibilities, our unique position among the trades of men makes our possible power or influence for good in every direction, immeasurable.

The builder occupies the middle ground between the producer and the consumer. He stands between the architect, manufacturer and dealer upon one side, and the artisan and owner upon the other. His example should be the standard of principle, insuring fair dealing and unquestioned business practice. Unfortunately there are evils peculiar to the building trades; evils which beset the path of the architect, the dealer and the contractor, offering to some irresistible temptation for larger profits and unfair advantages.

The voice of this Exchange is expressed in earnest protest against these evils, and every member should support the Exchange in its determination to maintain the dignity and honor of our trade.

Charity and generosity, virtues commonly conspicuous in man's relations with his home and his church, are ofttimes disregarded in his business dealings with his fellow men. Nothing is proof against human frailty, an element which must be reckoned with in business competition.

The mental capacity, or mental horizon, if you please, of men is hardly alike in two cases. Particularly among contractors, men have come into the trade from every possible condition and environment of earlier life. Many good contractors are of foreign birth and training, and are handicapped by natural conditions which do not lend themselves to a ready understanding of practice of the methods and customs of our country. It is not the rule that the man with the best education makes the best contractor.

Again, some men do not reach the front rank of popularity because of inherent personal characteristics. Business cares and responsibilities do not disturb the mental poise or personal bearing of some men. It is not fair to take as the true measure of a fellow contractor or dealer, his natural characteristics alone. If he has a proper regard for good principles in business practice, coupled with responsibility and a sufficient knowledge of his chosen trade, he is entitled to just consideration.

In no other branch of business is competition more sharply waged than with the contractor and builder, hence the spirit of fair dealing and fraternity should never be ignored. The influence of the Builders' Exchange in sustaining these virtues, is conceded and appreciated by all branches of trade.

Let us avoid unjust criticism and fault finding. Our Exchange and every member is benefited by honest criticism which exposes weaknesses and suggests remedies. Let us not be destructive by fault finding, but rather constructive by seeking the strength and the weakness of our organization, and assisting to find a remedy for what is weak and joining with others in wisely directing its strength for our greatest mutual benefit.

Every member has some ideas of value to the organization. The man who can give his ideas to others can better appreciate what he receives in return. I am hopeful that in the future a larger number of valuable, and heretofore silent, members will take an active part in Exchange affairs.

Let us regard the fundamental principles of our Exchange its declared principles; determine, each and every one, to stand by these principles; to have the same fealty and respect for the principles of our Exchange that we accord the general laws of the land which protect our property and society. Let the principles of our Exchange be the law that protects and dignifies our trade or calling, and insures to us the peaceful and profitable enjoyment of the results of our labor.

If the principles of the Exchange radiate and their light and precept and example permeate the individual acts of every member, the full meas-

*From an address by the President of the Cleveland Builders' Exchange.

ure of inspiration will follow for the greatest enjoyment of the practical and social features of our organization.

USEFUL HINTS.

The following useful hints are given by The Western Painter:

To Keep Brushes From Freezing.—A little glycerine added to the water in which paint brushes are suspended will prevent freezing in winter, and will not harm the brushes.

To Apply Black Japan.—Black japan is usually applied with a panel brush, and laid off the same as rubbing varnish.

To Preserve Brushes.—Many brushes are ruined by being carelessly left standing in a tub of water. They should be suspended so that the bristles cannot touch the bottom.

"Sandpaper" Putty.—To make a putty that will sandpaper easily and yet remain where it is placed, take dry white lead and mix it in ordinary brown japan, and add a little lampblack and a few drops of rubbing varnish. If the putty is desired to sandpaper very easily, a little turpentine may be added with advantage. The more varnish added, the tougher the putty will become and the more difficult it will be to sandpaper it.

To Prevent Pumice from Being Rubbed into Varnish.—To prevent pumice powder from being rubbed into the varnish, simply let your varnish coat become sufficiently hard before you attempt to rub it; and do not allow your pumice powder to dry on the varnish, but wash it off clean before it has any opportunity to stick.

How to Use Glue.—For glue to be properly effective it requires to penetrate the pores of the wood; and the more a body of the glue penetrates the wood, the more substantial a job will remain. Glues that take the longest to dry are to be preferred to those that dry quickly, the slow drying being always the strongest, other things being equal. For general use no method gives such good results as the following: Break the glue up small, put it into an iron kettle, cover the glue with water, and allow it to soak twelve hours. After soaking, boil it until done. Then pour into an airtight box, leave the cover off until cold, then cover up tight. As glue is required, cut out a portion and melt in the usual way. Expose no more of the made glue to the atmosphere for any length of time than is necessary, as the atmosphere is very destructive to made glue. Never heat made glue in a pot that is subject to the direct heat of a fire or of a lamp. All such methods of heating glue cannot be condemned in terms too severe. Do not use thick glue for joints or veneering. In all cases work it well into the wood, in a similar manner to what painters do with paint. Glue both surfaces of your work, except in cases of veneering. Never glue hot wood, as the hot wood will absorb the glue.

To Remove a Run of Varnish.—To remove a run of varnish on a panel easily and without tearing it, use fine pumice, water, and castile soap. Rub lightly, and attend well to work, or you may rub through into the color.

SELECTION AND CARE OF WIRE ROPE.

The following extracts from a recent article by A. B. Conover in The Mining Reporter should interest and prove valuable to quarrymen and contractors:

In buying ropes the purchaser should explain the conditions under which the rope is to work. One essential thing is to keep the rope well oiled so that the hemp centre is thoroughly saturated to prevent the inner wires from becoming rusty. I have seen ropes whose outer surface showed but little or no wear, and the general appearance of the rope would indicate it would wear for months, yet that same rope has broken without any indication of weakness. On examination the wires inside showed they were eaten up with rust, the hemp centre was gone and the weight of the load on the rope had drawn the strands together, thus wearing out inside, where the man examining the rope could not notice it. I know of serious accidents chargeable only to carelessness in not taking proper care of the ropes. The proper factor of safety should be not less than one to seven, i. e., one-seventh of the strength of the rope to represent the load to be lifted.

For general hoisting purposes I recommend a rope composed of six strands of nineteen wires each on account of its flexibility; for inclines where the rope has rough usage, such as dragging over the ground, I would recommend one made of six strands of seven wires each, as the wires are coarser they resist the friction better.

PAINTING AND DECORATING.

In the introduction to his excellent work on the above subject Mr. Walter Pearce says that the practical operations involved in painting and decorating must be based upon sound theoretical knowledge, otherwise they are invariably unsuccessful. One of the main factors in the decadence of good craftsmanship in the trade has been the lack of the perception of what is requisite, and the adoption of a striving for superficial, and often unnatural, effect, embodied under the phrase "what looks well." The wholesale provision of manufactured decorations, designed and coloured for anywhere in general and nowhere in particular, has fostered this spirit of laxy acceptance, and dwarfed the faculty of critical perception of what is suitable for given positions and use. It is not enough that the general style and scale of a frieze or a ceiling shall accord with its associated decoration, but the repeats, the angles and the whole setting out of the ornament, ought to be determined upon the spot. The habit of working to a ready-made specification, drawn up by persons devoid of a knowledge of the chemicals and and technical aspects of the craft, has also done much to discourage the practical interest of the craftsman in his operations. This has removed from him any responsibility for technical failures, and set up that destructive standard of comparison, cheapness, which is another foe to thorough and good workmanship. Nothing, on the other hand, is more helpful than an intelligently-drawn specification from a man who understands the capabilities and peculiarities of the materials and the craft.

A compliance with the hard, matter-of-fact laws of

utility is inseperable from good taste and sound craftsmanship. Beauty is so inextricably bound up with fitness, especially in relation to arrangement of form and colour, that we may almost assent to the proposition that in this connection abstract beauty cannot be considered to exist at all.

The excellence of work is, in a large measure, dependent on its efficiency in fulfilling the purpose for which it was executed. What would be an excellent finish for one class of work would show bad judgment and ignorance if used for some other position. Utilitarian considerations are of relatively greater weight than purely æsthetic considerations ; and whilst the endeavour of the decorative house painter should always be to cultivate and forward the æsthetic side of his craft, if he can show that the two considerations are really inseparable, he will go far towards persuading the householder to be less chary of spending his money for the purpose of making his home and surroundings well-preserved, tasteful, cleanly, beautiful and refined.

The question of colour deserves far more consideration than the average house painter gives to it. When it is remembered that a large quantity of external painting is done yearly, and the frequently unsatisfactory results, and contrast these with what might be done by the same amount of labour and material in the hands of a good colourist working in accord with a common well-defined scheme, astonishment is expressed at the supineness of those in authority, whose tastes are supposed to be cultivated. Compulsory legislation on the subject is almost pined for. Take for instance, the West-end of London, where acres, yea miles, of frontage are painted annualy, and practically the whole triennially. We are asked to just imagine a standard three or four colours made compulsory for outdoor work for a period of five years, and what a different scene the place would present ! Our cities, instead of reflecting the dirt and smoke in the colouring of the walls and roofs, might be cheery and even elevating to to the senses.

The query arises, is there some weighty element that makes for the universal sadness and badness ? It is believed there is, and that it is in a great measure due to a total misconception. Ninety per cent. of persons appear to think that the one desideratum in a paint is that it "won't show the dirt." This is quite desirable, but when the desideratum is obtained by using "dirt colour," it evidences a lack of thought and a failute to appreciate the value of colour. In however dirty an atmosphere they may be placed, clean-looking tints will look cleaner than the dirty sombre ones, and under the ordinary deposits of soot and dust bright colors will have a generally cleaner and brighter appearance than grays and drabs. Yellows, blues, and reds, when bright in hue, will, it is said, actually be improved and and toned by the accumulation of a normal quantity of dust. These facts, it is urged, should be borne in mind, and no opportunity allowed to pass unimproved when the surroundings of our life may be cheered and brightened by a little of one of God's best gifts to man, "colour."

"Now," quoth an impecunious nobleman to a cautious architect, "I want a mansion five storeys high."

"It will be very expensive," was the considerate objection.

"Ah," returned my Lord, "but that's another storey." We'll stop at five.—Irish Builder.

AREA OF PIPES IN HEATING SYSTEMS.

In answer to the enquiry of a correspondent F. Dye writes in the British Plumber and Decorator. There are tables, in the books on hot water heating, which give the sizes of main or branch services suited for various areas of heating surface, and for 70 ft. of 2 in. pipe the connections would be given as 1¼ in. This latter, however, is not the best size in a general sense ; it is the minimum that will give normally good results and it is best only in costing the least for successful working. So far as quick results, speed of circulation, noiselessness with excessive firing, etc., are concerned then 1½ in. is better than 1¼ in., while 2 in. would be better than both. Briefly, the larger the pipe the more successful the circulation is, and the only fault attached to large pipes is that they offer a larger heat-losing surface if they are not covered or protected and are run in cold situations. This would not apply in this instance, as the radiating pipes commence within two or three feet of the boiler.

MORTAR IN FROSTY WEATHER.

There are many substances which can be used to resist the action of frost on mortor, but it is questionable says The Irish Builder whether they are purely effective. Alum certainly lowers the freezing point, but its use is not recommended. It is a salt, and when the atmosphere is damp the absorbent nature of the alum would show itself by damp walls. Sulphuric acid is sometimes employed. Add a small quantity of sulphuric acid to the water with which the mortar is to be mixed, only instead of using slaked lime use quicklime; but mortar made in this way can only be employed in slight frosts. Smith's ashes have a selenitizing action, as they are rich in sulphurous acid. The use of sugar or saccharine mixed with mortar is to have a quicker set, and to harden it. It is therefore a race between sugar and frost; if the sugar causes the mortar to set before the frost attacks it, the sugar wins; but if the frost attacks the mortar before the sugar sets it, the frost wins. As yet we must give in to the frost, for there is no cheap solution to the problem.

REINFORCED CONCRETE.

It is learned from the Architectural Record that an interesting test in connection with the strengthening of concrete by steel, which is attracting so much attention, was made recently at Messrs. Connal's pig-iron stores, Glasgow, upon a slab of concrete 7 in. thick and 15 ft. by 15 ft. in the clear, with a tension bond of Expanded Metal (steel) about ¾ in. from its lower surface. The slab, which had been completed some three months, was supported by dwarf walls 3 ft. high and had a bearing on these walls of 6 in. on all four sides. On November 12th a preliminary test was made, and the slab loaded to the extent of an evenly-distributed load of 3 cwts. per sq. ft., which had remained there until the final test was made. The object of the final test was to ascertain the ultimate load which a slab could sustain up to the breaking point. The inspection committee consisted of Mr. A. T. Walmisley, M. I. C. E., engineer to the Dover Harbour Board ; Mr. J. P. Allen, P.A.S.I., of Newcastle-on-Tyne ; and Mr. Andrew Home Morton, A.M.I.C.E., of Glasgow. The total breaking load amounted to 56 tons 11 cwts., when the slab gave way, the fracture radiating from the centre towards each angle of the square. There was no evidence of the supporting walls sinking.

INTERNATIONAL FIRE PREVENTION CONGRESS.

This Congress, convened by the British Fire Prevention Commitee, is to be held in London, July 7th to 18th next.

The Congress will sit in General Congress and also in Sectional Congress. There will be six sections as follows :—I. Building Construction and Equipment ; II. Electrical Safeguards and Protection from Lightning ; III. Legislation and Adminstration ; IV. Fire Survey and Fire Brigade Patrols ; V. Insurance and Fire Losses ; VI. Standards and Tests for Materials.

The primary objects of the Congress, among others are as follows :—

I. To discuss the practice of building construction and the application of building materials from a fire preventative point of view ; to compare the practice in different countries, and to inquire into the latest materials and systems of construction available, as also the latest inventions for the general equipment of buildings.

II. To discuss the equipment of buildings particularly in relation to the application of electric power and electric light, and to receive the views of electrical engineers and fire brigade officers as to the origin and prevention of electrical fires, including fires caused by lightning.

III. To discuss the legislative enactments in force in cities and districts, particularly in respect to the limitations of area or cubical contents for warehouse buildings and workshops, and the means of separating and uniting such buildings, also the means of escape in case of fire ; further, to consider particularly the regulations governing the construction and control of theatres and places of public resort, and the provision of staircases and means of escape for the audience and employees ; as also the regulations governing the construction of dwelling-houses and houses let in tenements, and the amount of fire-resistance to be provided and the means of escape in case of fire.

IV. To discuss the best means of watching or inspecting buildings and plant exposed to fire risks without due inconvenience to owners and occupiers, the practice of fire brigades in this dirretion, and the experience of the various fire patrol systems.

V. To discuss the practice of insurance against fire ; to ascertain the systems adopted in various countries ; the risks insured against ; the regulations and requirements of the national, municipal, public and private insurance corporations, and to inquire into the systems of mutual insurance, the precautions taken against incendiarism, the statistical record of fire losses, and the preparation of uniform fire maps and plans.

VI. To discuss the best means of recording the causes and effect of fires, and tabulating the results, so that a basis for comparison may be obtained and standards compiled for various degrees of fire resistance required in different buildings and suited for various materials ; to discuss the best melhods of testing materials and recording the facts of such tests for the information of those engaged in the construction, use and protection of buildings from fire.

The Parkin & Somerville, Elevator Co., whose announcement appears on front cover of this number have recently commenced the manufacture at Hamilton, Ont., of elevators for all purposes, and have successfully carried out a number of contracts in this line.

Mr. Edmund M. Wheelwright, the well-known architect of Boston, recently delivered an interesting lecture illustrated by lantern slides in the Art Gallery, Montreal, on "Bridges." The lecturer traced the history of bridge construction from the time of the Romans, and pleaded that greater attention should be paid here as in Europe to artistic effect in bridges.

The richly decorated west front of the cathedral at Exeter, England, is to be remodeled in the interests of safety, the seven centuries old wall having shown signs of collapse. As much of the statuary as possible will be retained in the remodeled wall, and the remainder will be carefully copied and restored. The famous cathedral was begun in 1280 and completed in 1371, the west front being finished last.

—THE—

CANADIAN ARCHITECT AND BUILDER

A Monthly Journal of Modern Constructive Methods,

(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD).

PUBLISHED ON THE THIRD WEDNESDAY IN EACH MONTH IN THE INTEREST OF

ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS DECORATORS, BUILDERS, CONTRACTORS, MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

The C. H. MORTIMER PUBLISHING CO. of Toronto, Limited.
Publishers,
Confederation Life Building, - TORONTO, CANADA.
Telephone Main, 2362.

Branch Offices:
IMPERIAL LIFE INSURANCE BUILDING, MONTREAL.
Bell Telephone 2299.
22 GREAT ST. HELEN'S, LONDON, E.C.

SUBSCRIPTIONS.

THE CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States on the following terms: Architects' Edition, $3.00 per year; Regular Edition, $2.00 per year. The price to foreign subscribers is: Architects' Edition, 16 shillings; Regular Edition, 12 shillings. Subscriptions are payable in advance. The Journal will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, will be continued until instructions to discontinue are received and all arrears of subscription paid.

ADVERTISEMENTS.

Prices for advertisements sent promptly on application. Orders for advertisements should reach the office of publication not later than the 12th, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of value to the persons in whose interest this journal is published are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

Subscribers who may change their address should give prompt notice of same. In doing so, give both old and new address Notify the publishers of any irregularity in delivery.

ONTARIO ASSOCIATION OF ARCHITECTS.

OFFIERS F OR 1903.

PRESIDENT - -	W. L. SYMONS, Toronto
1ST VICE-PRESIDENT -	GEO. W. GOUINLOCK, Toronto
2ND VICE-PRESIDENT	PROF. C. H. C. Wright. ,,
TREASURER - -	A. R. DENISON. ,,
REGISTRAR - -	W. R. GREGG, 94 King St., Toronto.

COUNCIL:

EDMUND BURKE - - - - - - -	Toronto
LAWRENCE MUNRO - - - - - - -	Hamilton
JOHN GEMMELL - - - - - - -	Toronto
HENRY SIMPSON - - - - - - -	,,
J. W. SIDDALL - - - - - - -	,,

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

OFFICERS FOR 1902.

PRESIDENT - -	J. VENNE, Montreal.
1ST VICE-PRESIDENT -	W. E. DORAN, Montreal.
2ND VICE-PRESIDENT -	R. P. LEMAY, Quebec.
SECRETARY - -	PROF. S. H. CAPPER, Montreal.
TREASURER - - -	J. S. ARCHIBALD, Montreal.

COUNCIL.

G. E. TANGUAY - - - -	Quebec.
A. PAZA - - - - - -	Montreal.
A. C. HUTCHISON - - - -	Montreal.
D. R. BROWN - - - - - -	Montreal.
A. A. COX - - - - - -	Montreal.
S. LESAGE - - - - - -	Montreal.

AUDITORS—C. DUFORT, Montreal; J. H. LEBRON, Quebec.

TORONTO BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

JOSEPH RUSSELL, President.	MESSRS. NELSON
R. G. KIRBY, 1st Vice-President.	WELLER.
JOHN HOIDGE, 2nd Vice-President.	CRANG
DAVID WILLIAMS, Treasurer.	MARTIN
MESSRS. CLAY AND HOLMES, Auditors.	SMALLWOOD.
JOHN SCOTT.	LOGAN.

JOHN M. GANDER, Representative on Technical School Board.
JAMES B. THOMSON, Repres ntative on Exhibition Board.

LONDON BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

J. C. Simpson, President.	WM. TYTLER.
JOHN NUTKINS, 1st Vice-President.	THOS. JONES.
JOHN WHITTAKER, 2nd Vice-President.	ED. MARTYN.
GEO. S. GOULD, Secretary-Treasurer.	GEO. YOUNG
	S. STEVE Y.

VANCOUVER BUILDERS' EXCHANGE.

BOARD OF DIRECTORS

E. COOK, President.	C. P. SHINDLER.
A. E. CARTER, Secretary.	K. M. FRASER.
H. A. BELL, Treasurer.	E. G. BAYNES.
T. BRADBERY	D. SAUL

WINNIPEG MASTER CARPENTERS' ASSOCIATION

BOARD OF DIRECTORS

A. MACDONALD, President.	A. MCCORMICK, Secretary.
A. G. AKIN, 1st Vice-President.	J. G. LATIMER, Treasurer.
A. SUTHERLAND, 2nd Vice-President.	

MASON BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

D. D. WOOD, President.	A. N. MCCUTCHEON, 1st Vice-President
W. F. LEE, 2nd Vice-President.	A. T DAVIDSON, Secretary.
EDWARD CASS, Treasurer	WILLIAM ALSIP.
D. T. JACKSON.	ANGUS BROWN.
J. MALCOM.	

MONTREAL BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

C. T. WILLIAMS, President.	H. R. IVES.
C.W. HUGHES, Vice-President.	JAMES PATON.
G. J. SHEPARD, Secretary-Treasurer.	N. T. GAGNON.
JOHN WIGHTON.	JOSEPH LAMARCHE.

CHAMBRE SYNDICATE DE LA CONSTRUCTION.

(French Builders' Exchange.)

83 St. James Street, Montreal.

BOARD OF DIRECTORS.

J. B. GRATTON, President.	FELIX SAURAGEAN.
G. MENARD, 1st Vice-President.	L. Z. MATHIE .
T. CHARPENTIER, JR., 2nd Vice-President.	H. CONTANT.
ALCIDE CHAUS E Treasurer.	E z COTE
N. T. GAGNON, Secretary.	LOUIS PAYETTE.

VICTORIA BUILDERS' EXCHANGE, VICTORIA, B. C.

BOARD OF DIRECTORS:

W. D MCKILLICAN - -	Chairman
E. W. WHITTINGTON - -	Secretary
THOS. CATTERALL - - -	Treasurer

BUSINESS NOTE.

The Frink system of reflectors is the best for lighting pictures in galleries and private houses and is coming more and more into use. The Frink Company have recently completed the installation of their reflectors in the American Art Galleries New York, also in the new galleries of the Drexel Institute in Philadelphia and have just finished putting them in the delivery room of the Boston Library for the purpose of lighting Mr. Abbey's "Holy Grail" decorations.

THE DECORATION OF CEILINGS.

An authority upon the subject of interior decoration has expressed the opinion that if only one part of a room be decorated, that part should be the ceiling. He says :—"Nothing appears to me more strange than that our ceilings, which can be properly seen, are often white, while the walls, which are always in part hidden, and even the floor on which we tread, should have color and pattern applied to them ; and of this I am certain, that, considered from a decorative point of view, our ordinary treatment is wrong."

A ceiling may be an object of great beauty, and it can be seen as a whole, therefore in many public buildings the decoration of the ceiling might be very advantageous.

If a ceiling be quite flat and without raised mouldings or ornaments, all decorations placed upon it must be flat also, and must not represent fictitious relief, for no shaded ornament can be satisfactory when placed as the decoration of a flat architectural surface.

Many circumstances tend to determine the nature of the decoration to be applied to a ceiling; thus, if a ceiling be structurally divided into square panels, the character of the ornament is thereby restricted, and should these panels be large it would probably be desirable that each be filled with similar ornamentation ; while if they are small, three or four different patterns may be employed, if arranged in some orderly or regular manner.

On the Continent, and to some extent in this country, ceilings have been painted with large pictures, covering the whole or a portion of the surface ; but this is quite a wrong method, for a picture of such a kind could only be seen the right way up, from one point in the room ; from all others it would be viewed upside down, or from one side or corner.

But apart from this, a ceiling being flat surface, all decoration upon it should be flat also. In many of the French ceilings the picture is painted in such a position as to be seen properly only by a person standing with his back to the fire.

The Egyptians decorated their ceilings, so did the Greeks, the Byzantines, the Moors, and the peoples of the Middle Ages, and the ceilings were by no means always of a light colour. It is remarkable that so few of our public buildings contain rooms with well decorated ceilings, but there have been more executed during the last few years, and there appears to be a tendency for their adoption in connection with modern buildings.

Architects and building owners should be interested in the announcement on page i of this issue of the Smith-Warren Co., of New York. The company manufacture the "Smith" system of metal window frames and sashes for holding wired glass. These windows have proved to be an efficient protection against fire and are accepted by the Underwriters in lieu of fire shutters. All moveable sashes, whether sliding or swinging close automatically at 155 degrees of heat. The sliding sashes are also made for cleaning from inside of building. As a means of reducing the fire risk and thereby lowering cost of insurance these windows are worthy of consideration and trial.

PERSONAL.

Mr. J. Greenfield, architect, has removed his offices to Room No. 24, Canada Block, Winnipeg.

Mr. Thos. Kennedy, after an absence of three years in the Northwest, has returned to Barrie, Ont., and resumed his architectural practice.

Mr. A. W. Peene, architect, has recently filled the position of superintendent of the Hamilton Art School, pending the appointment of a permanent superintendent.

Mr. Ebenezer North, a prominent contractor, and one of the oldest residents of London, Ont., died unexpectedly of heart disease in that city on the 14th inst. The deceased was born in Lincnolshire, Eng., seventy years ago.

Mr. A. J. Cooke, architect, of Montreal, died at his residence at St. Lambert, on Feb. 23rd, from hemorrhage of the lungs. Mr. Cooke was a Londoner by birth and was apprenticed there hy Mr. Andrew T. Taylor, F.R.I.B.A., coming out to that gentlemen's Montreal office in 1883. For some six years he was with Mr. McLea Walbank and then started in practice for himself. He was well-known, especially in Westmount, where he built upwards of one hundred houses.

An artistically printed booklet referring to the manufacture and uses of Portland cement has been published by the Canadian Portland Cement Co., Limited. It contains numerous illustrations of works in which the company's material was employed.

LEGAL.

On December 19th last, a British jury without leaving the box, decided that the Taff Vale Railway Company were entitled to damages against the Amalgamed Society of Railway Servants for losses sustained by reason of the action of members of the society in connection with the strike of the company's employees in 1900. This decision makes trade organizations legally responsible for damages arising out of the conduct of their members. The next step should be to compel the incorporation of such organizations so that their funds would be liable for payment of damages for which they might be held by the courts to be justly liable.

NOTES.

The Brickmakers' Association of Hamilton have announced that the price of new bricks will be $7 per thousand, or $2 below the price of last year's stock.

A new and useful clause in the recently revised building regulations of Paris, provides that any shutter, blind or sunshade placed not more than 10 feet above the pavement must either be within the body of the wall or must not open outward. There are also minute regulations concerning verandahs, awnings, sun-blinds, outside lamps, cornices and signs.

NOTES,

The Toronto Master Plumbers' Association held a banquet at McConkey's restaurant on the evening of the 20th inst. Mr. Fred Armstrong, chairman, aided by a strong committee had the matter in hand.

The plumbing by-law of Ottawa is undergoing revision at the hands of representatives of the City Council, the Master and Journeymen Plumbers' Associations, W. C. Edey, architect, and S.J. Davis, builder.

Mr. Wm. Moat, Eccles Hall, Staffordshire, Eng., has recently given to the Church of St. James the Apostle in Montreal a pulpit of Caen Stone, artistic in design, as a memorial of the donor's grandfather, the late William Workman, ex-Mayor.

Capt. Maunsell, assistant engineer and architect of the Militia Department, at Ottawa, is at present on a tour of inspection of armories in leading cities in the United States, with a view of determining the most serviceable description of building and arrangement for armories in this country.

A novel idea in building has been carried out by Messrs. Carrere and Hastings, the architects of the new building now being erected on the site of the disused reservoir in Bryant Park for the New York Public Library. This is the erection of a portion of the main front in plaster, in the full size of the original. While architects are accustomed to execute the most elaborate work from drawings, and models are employed for sculptural and ornamental details, it is seldom that so large and costly a model is made as in this case, where an entire bay, with windows, inclosing columns and roof balustrade, has been built up in full size on a portion of the actual site. The model is supported in position by the scaffolding for the actual building and the framework of the derricks from which the masonry and bricks will be lifted into position.

NOTES.

The annual meeting of the Toronto Guild of Civic Art was held in Toronto last month, when the following officers were elected:—President, Col. Pellatt; Vice-Presidents, Prof. James Mavor and R. Y. Ellis; Treasurer, James Bain, jun.; Secretary, A. H. Campbell, jun.

The question is being seriously discussed in Athens of reconstructing the ancient Temple of Erechtheus, in Athens. The "Asty" states that most of the broken fragments of the entablature lie littered about the ground, together with great slabs of marble, which, if replaced in position, would again give visitors some idea of the beauty of the temple as it originally stood. The Archæological Society of Athens has voted 20,000 drachmas for the work.

British Trade Supplement

The Publishers of **"The Canadian Architect and Builder"** have arranged to furnish information respecting British Exporters of Building Materials and their goods advertised in this paper, and will keep on file at their Offices, Imperial Building, Montreal, and Confederation Life Building, Toronto, **Catalogues, Price Lists, Etc.**

Catalogues will be forwarded to Architects and Building Supply Houses in Canada on application.

British Office: 22 Great St. Helen's, LONDON, E. C.

British Trade Supplement

British Trade Supplement

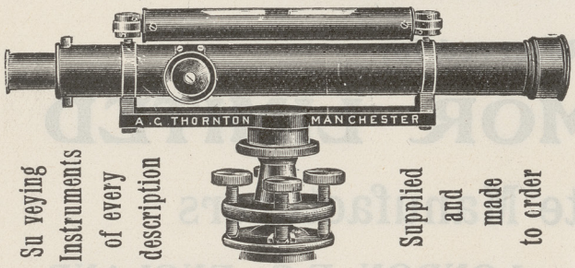
DRAWING AND SURVEYING INSTRUMENTS, &C.

ENGLISH MAKE, THE LATEST, THE BEST AND THE CHEAPEST

☞ *New Edition of Illustrated Catalogue Just Published, Post Free*

THE "DESIDERATUM" LEVEL

No. 3637



Surveying Instruments of every description Supplied and made to order

English make, 12 in. Telescope, Bronzed, with Case and Tripod, as illustrated, complete.

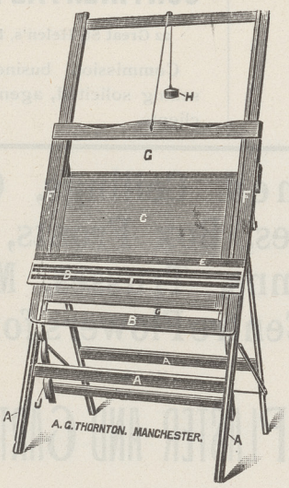
No. 4462. The **"Grosvenor" Level,** 14 in. Telescope, Bronzed, 2 Eye-Pieces, Polished Mahogany Case, and Tripod complete.

The above are best value ever offered by any firm.

By His Majesty's Royal Letters Patent

THE "NERITE" ADJUSTABLE DRAWING BOARD AND SQUARE

No drawing office should be without this apparatus, combining Utility with Economy.



Full particulars with prices on application. Supplied any size.

Can be quickly and easily adjusted to whatever position best lends itself to perfect execution, or ministers most to the worker's comfort and convenience.

HALF THE PRICE of the similar apparatus in use in America, Germany and elsewhere.

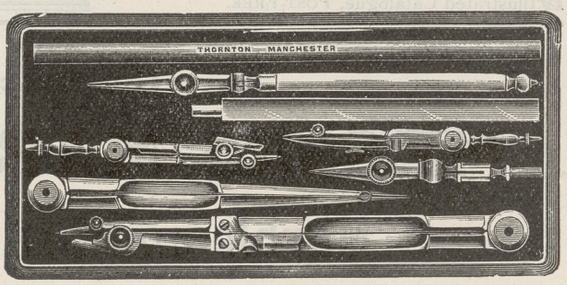
JUST PUBLISHED

NEW EDITION OF ILLUSTRATED CATALOGUE

By far the best and most complete issued.

Contains prices and particulars of all improvements to date. Post Free.

ENGLISH ELECTRUM INSTRUMENTS.



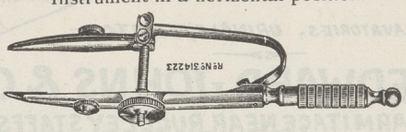
No. 3562. As Illustrated, 6 in. Compass (other instruments in proportionate sizes) Needle Points, Steel Joints, in flat Morocco Packet Case..... 33s 6d

Unequalled at the price for the quality. For particulars and prices of the best, most complete, original and cheapest Cases of English Instruments ever offered, see New Edition of Catalogue, post free.

THORNTON'S PARALLEL SPRING BOW PEN

Quite new. Registered No. 314223.

Will draw circles of any diameter within its range, holding the Instrument in a horizontal position.

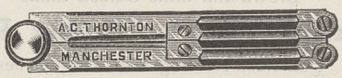


No. 6002. **Parallel Spring Bow Pen,** as above, extra quality, Electrum Bolt and Nut, Needle Point.. 9s 6d

No. 6003. Above Pen, with Pencil and Divider, Electrum Belt and Nut, Needle Point. Set of three in Morrocco Case..... 22s 6d

THORNTON'S IMPROVED ENGLISH NAPIER COMPASS

with Bolt and Nut, Needle Points.



No. 3502½. In Electrum, extra quality..... 25s

No. 3504a. In Aluminium, extra quality..... 35s

This latter weighs under ½ oz., and forms a set of Drawing Instruments in a single tool.

THORNTON'S TRANSPARENT SKIN DRAWING

The cheapest and most useful Paper that has been introduced for Drawing Office requirements.

	20	23	30	40	43 inches wide.
No. 6000.	2s 3d	2s 9d	4s 3d	5s 9d	6s 9d per roll of 28-yds.

Free from Preparation, can be used as a Drawing, Detail or Tracing Paper; also for originals to copy from by Photography. Drawing and Tracing Papers and Cloths of every description. In sheets or continuous rolls. Samples and Prices post free.

Photo Materials and Papers for Copying Tracings.

CONTRACTOR TO HIS MAJESTY'S GOVERNMENT

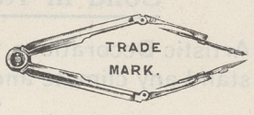
Telegrams: "Drawing, Manchester."

A. G. THORNTON

PRACTICAL MANUFACTURER

ST. MARY STREET, MANCHESTER

TELEPHONE



NO. 3273.

AGENTS FOR CANADA:

THE C. H. MORTIMER PUBLISHING COMPANY, Limited, Imperial Building, Montreal, and Confederation Life Building, Toronto

Please mention this paper when corresponding with advertisers.

Classified Directory of Montreal Contractors and Dealers in Builders' Supplies

BUILDING MATERIALS

E. F. DARTNELL.
Stone Pressed and Common Bricks, Mineral Wool, etc.
Telephone 2382. 180 St. James Street.

T. A. MORRISON & CO.,
Milton Pressed Bricks, Limestone and Sandstones, Contractors' Plant, Crushed Stone for Concrete, etc.
204 St. James St., Montreal.

JAS. W. PYKE & CO.
Importers Structural Material—Iron and Steel
Telephone 312. Merchants Bank Bldg.

Subscribe for the ARCHITECT AND BUILDER.

ROOFERS

D. NICHOLSON & CO., Roofers, 679 St. Paul Street, Montreal. Gravel Roofing a Specialty. —Repairs of all kinds promptly attended to.—
Bell Telephone 1665.

Advertise in the ARCHITECT AND BUILDER

Classified Directory of Toronto Contractors and Dealers in Builders' Supplies

BUILDING MATERIALS

GEORGE RATHBONE, 2 Northcote Ave. Pine, Hemlock and Hardwood Lumber; Lath, Shingles and Cedar Posts; Sawn Veneers. Re-sawing up to 30 inches wide a specialty.

Ontario Lime Association
Manufacturers and Dealers in
Grey Lime, Guelph White Lime, Ontario Cement, Portland Cements Plaster Paris, Hair, Fire Brick, Fire Clay, Sewer Pipe, etc.
Telephone 920. ***118 Esplanade St. E., Toronto***

BUILDERS and CONTRACTORS

FREDERIC HOLMES, Contractor
Telephone North 663. 1111 Yonge St., TORONTO.
Estimates given for Cut Stone, Brickwork, Etc.

JAMES ISAAC
Cut Stone Contractor,
20 Dupont Street, Toronto.

MANTELS, GRATES and TILES

Toronto Hardware Mfg. Co.
1100 Queen St. W.
ALSO PLUMBERS' SUPPLIES.

ROOFERS

ROBT. RENNIE & SON,
Terra Cotta Tile,
SLATE AND GRAVEL ROOFERS, &c.
Every description of Roofing Slate always on hand. Galvanized Iron Ridges, Valleys and Flashings supplied.
Telephone 2344. 378 Berkeley St., TORONTO.

H. WILLIAMS & CO.,
23 Toronto St. - TORONTO.
ROOFERS
With Slate, Felt and Gravel; also Williams' Flat Slate Roof—the best. We lay ROCK ASPHALT on cellar bottoms, floors and walks—the best material for this work. **Telephone No. 511.**

W. T. STEWART & CO.
Felt and Slate Roofers,
Dealers in Felt, Pitch, Tar, Sheathing Paper, Carpet Paper, and all kinds of Building Paper.
Office: Cor. Adelaide and Bay Sts., TORONTO.
Estimates furnished. Telephone No. 698.

G. DUTHIE & SONS,
Terra Cotta Tile, Slate and Felt Roofers,
Cor. Widmer and Adelaide Sts., - TORONTO.
GALVANIZED IRON FURNISHINGS SUPPLIED.
Telephone 1936.

—ESTABLISHED 1856—
Slate and Felt Roofing.
FORBES ROOFING CO. - 153 Bay St

DOUGLAS BROS.
SLATE, TILE AND METAL ROOFERS.
Sheet Metal Work, Metallic Ceilings, Skylights, etc.
24 Adelaide Street West, TORONTO.
Telephone 360,

PIONEER GALVANIZED IRON WORKS
ESTABLISHED 1855.
GEORGE RINGHAM
23 and 25 Edward Street, TORONTO
Copper and Galvanized Iron Cornices, Skylights, Etc., Metal Ceilings
Felt and Slate Roofing, Phone 2572.

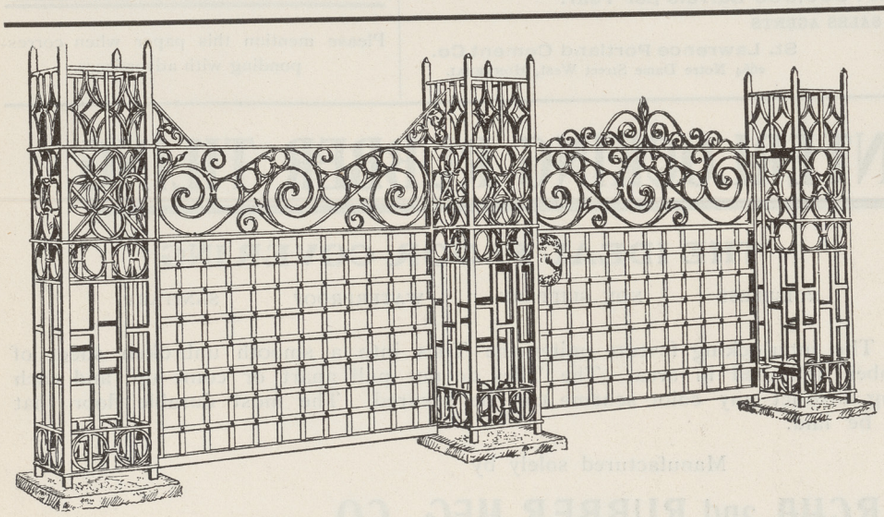
MOVERS

I. WARDELL & SON
450 Spadina Avenue,
Move Frame and Brick Houses and Machinery.

Send for 3rd edition of the Canadian Contractors' Handbook. Price $1.50; $1.00 to subscribers of the Canadian Architect and Builder.

THE C. H. MORTIMER PUBLISHING CO. OF TORONTO, LIMITED.

SPECIFY HOLLYWOOD PAINT



Special Designs in
IRON FENCING

BANK RAILINGS
WROT IRONS
WIRE WORK

THE GEO. B. MEADOWS, Toronto, Wire, Iron and Brass Works Company, Limited
TORONTO, CANADA